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ABSTRACT

This paper presents basic information about the brain and how learning takes place, considers causes of differing human temperaments as explained by principles of Jungian psychology, reports on research on the causes of low achievement, and suggests a method to correct many educational problems. Principles of developmental neurology and right/left brain differences are explained. Many educational problems (such as anger and anxiety) are viewed as resulting from downshifting from the neo-cortex to the limbic system. Four major temperament groups are identified, varying in the dominance and influence of right and left brain hemispheres. The paper reports positive behavioral and academic effects observed when junior high school students were provided with basic information on the brain and suggestions for controlling and preventing downshifting. The seven types of intelligence postulated by Howard Gardner are also discussed. Teachers are urged to: (1) teach students about the brain; (2) explain the whole picture before starting a unit; (3) adapt material for the poor reader; (4) outline and organize for students with dominant right hemispheres; (5) adapt for students with auditory, visual, and kinesthetic, right/left hemispheric learning modalities; (6) hold high positive expectations and guarantee success; (7) use discipline based on principles of preventing downshifting; and (8) set up the classroom to maximize fairness and caring. Problems with grading are discussed. Contains six references. (DB)

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Knowledge About the Brain for Parents, Students, and Teachers: The Keys to Removing the Invisible Roadblocks to Learning and High Self-Esteem for All Students

Claude R. Beamish

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UNDERSTANDING THE CAUSES AND RESULTS OF THE HUMAN BRAIN'S OWN REACTIONS TO STRESS and anxiety is the key to seeing the causes of and finding the solutions for most of today's increasing educational problems. Unneeded and unwanted anxiety and anger are the roadblocks to student and teacher success. Seeing the solutions will come through the combination of three pieces of knowledge. First is the knowledge on the brain about how learning takes place and what determines our aptitudes and talents. Material based on Jungian Psychology will be presented second. This material will be the basis for understanding the causes of the differing human temperaments that set up individual students and teachers for different levels of anxiety and anger. Thirdly, there are the results of six years of research in the classroom where the main causes of low achievement were found. A suggested method to correct many of our educational problems will follow the three individual pieces of the puzzle. We will start with the brain.

As the brain grows from birth until about 21 years of age, it increases in weight from 1 pound to 3 pounds. This happens as the brain moves through its transition from a child's brain to an adult's brain. This growth in size and weight occurs as the brain adds dendrites and glial cells. Dendrites are tentacle or branching-like growths added to the cell body of neurons as the brain learns and adds memory. Glial cells are "helper cells" that surround the neurons and fill the spaces between the neurons. The main job of glial cells is to feed and take care of neurons as they increase in size from the addition of large numbers of dendrites. A labeled drawing of a typical neuron is shown in Figure 1.

Messages come in through the dendrites to the cell body. When the cell body determines that the message should be passed on, the message is sent down the axon out to the dendrites of other cells. In those areas of the brain where the neurons have a myelin sheath around the axon, communication between neurons is faster and clearer. A myelin sheath is a layer of insulating fat that is laid down around the axons in genetically predetermined patterns. This

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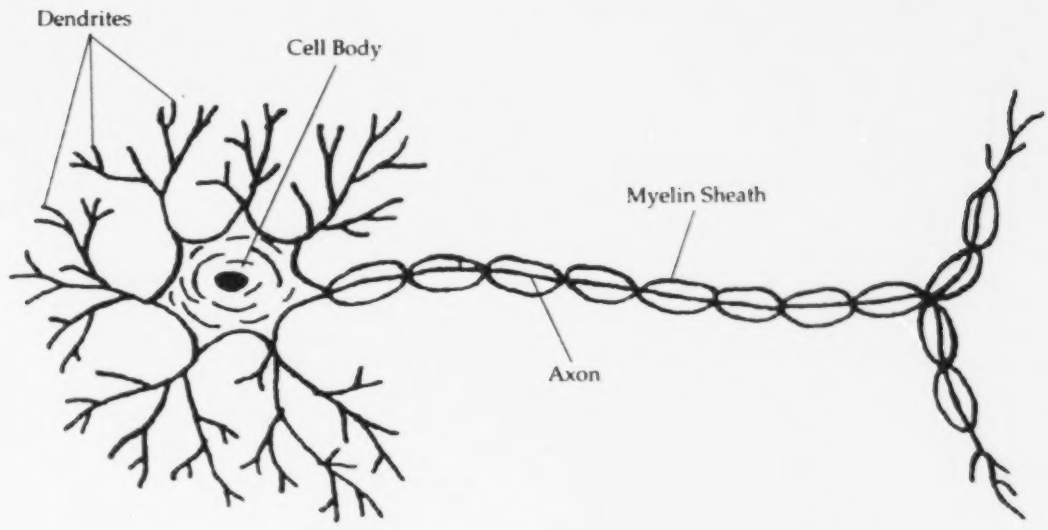

Figure 1. Diagram of a typical neuron.

addition of the myelin sheath to large numbers of neurons in specific areas of the brain is called "myelination." It gives individuals their specific talents and abilities at different times in their lives. The myelination of the axons of cells in different areas of the brain happens in a predictable sequence over a period of about 48 years. The process of myelinating portions of enough areas of the brain to have the abilities and tendencies for your true personality finishes by about 24 years of age. At age 24, with only half the brain myelinated, individuals tend to be more positive of their beliefs and, possibly, less tolerant of others. As the brain continues to myelinate the complementary areas of the brain, an individual should gain or strengthen some abilities that were missing or weak. This will only happen if the individual does not reject these new feelings and abilities. Along with gaining better or new abilities comes the ability to see the world in a different light. For many individuals this new awareness may cause them to go through what many call a mid-life crisis. This happens in the mid-forties when the brain, with its new awarenesses, may start questioning old strongly held beliefs and needs. Teachers passing through this crisis stage of life may have more problems getting their students to achieve. This is because any increase in anxiety or anger on the part of the teacher can cause anger and anxiety in the students that will form more roadblocks to learning.

The brain's reactions to events that cause stress and anxiety can have definite negative effects on the brain's rate or level of growth and development of dendrites. The human brain's natural method for dealing with stress, anxiety, or failure is to switch blood flow down in the brain so as to use the "limbic system." The limbic system is a faster acting portion of the brain that handles the more into-the-moment needs such as hunger, territorialism, sex drives, and other emotionally based situations (Paul MacLean, 1978). When an individual moves down to use the limbic system, long and short term memory are shut off. Since creating memory involves the development of dendrites and this development is shut off while the brain relies on the

limbic system, basic brain growth also is slowed at this time. The act of moving down in the brain to use the faster acting limbic system was called "downshifting" by Leslie Hart (1983). The less flexibility, tolerance, and acceptance an individual has the more downshifting and the less brain growth or development of dendrites occurs.

The brain from left to right and top to bottom has a spectrum of differing abilities or tendencies (Sylwester, 1991). Remember, as the myelin sheath is added around the axons of neurons in specific areas of the brain, these areas gain greater speed, clarity, and ability. Each individual can have varying patterns of myelination, thus having varying talents and ability, possibly differing from the people around them. These abilities developed through different myelination patterns allow humans to cope with the needs of their differing and often complex environments, occupations, and activities. The further to the left side or the lower we go in the brain, the less flexibility, tolerance, and acceptance we see. This lack of flexibility, tolerance, and acceptance is both a partial cause of downshifting and a direct result of downshifting, since the brain has a tendency to move to the left and down during downshifting. Since downshifting is caused by this movement and also causes the same movement, downshifting can lead to a self-feeding negative spiral. Brain growth is curtailed during this time as long and short term memory (which entails the development of dendrites) are shut off. Individuals lose the development of their brain when they move down to use the limbic system during periods of anxiety or anger. Prolonged use of drugs or alcohol that impede the brain's ability to handle life's situations also curtails development or growth of the brain. Since the educational system seems to be responsible for the development of the brains of humans, avoiding downshifting in students should be very important to teachers, parents, and administrators. Remember, students cannot create dendrites (learn) when they are experiencing anxiety or anger. Since anger breeds anger and anxiety, teachers and parents should be careful to control their negative emotions if they expect their children to learn.

Since the brain is developing or myelinating over a period of so many years, teachers are dealing with students who have brains that have differing levels of development. In order to avoid downshifting, students need to be informed about their brain's structure and natural abilities, including the information about the function of and results of downshifting. Because students will be missing many aptitudes and abilities that they *may* gain later as the brain myelinates other needed areas, students should be given certain latitudes or freedoms while their brain is in transition. Punishing behaviors that are the result of an undeveloped brain or a brain that has not myelinated the neurons in a needed portion of the brain will cause these students to downshift into the limbic system. The resulting loss of long and short term memory will inhibit the brain development the educational system seeks.

Many of the differences between students, for which many students are looked down upon and often punished, are the results of differences in right and left hemisphere abilities or brain area usage tendencies. Students are locked into certain abilities or brain area usage tendencies because of the areas that are myelinated within each student's brain. These differences may or may not be compensated for in the later stages of brain development. Some students will be consistently on time with assignments and for activities or classes, others will not be. These are natural tendencies depending upon which hemisphere, or portions there of, are myelinated and being used by the students. Most left hemisphere dominant students, who have more myelination in the left hemisphere, have a

natural need or tendency to finish projects and be on time (Figure 2). Because of the right hemisphere's tendency to explore, question, and enjoy doing varying exciting or interesting activities, many students who have greater myelination in the right hemisphere may often have problems being on time and finishing tasks on time. The prefrontal lobes of the brain, which give us the ability to plan ahead, do not become functional until between 17 and 24 years of age. This ability to plan ahead is a function that could possibly compensate for some of the missing left hemisphere myelination, but since it develops after most students are out of school, it happens too late to affect most students' educational experience. The left hemisphere functions of finishing and being on time are functions that are thought to be myelinated in only 50% of the population. The individuals in the other 50% of the population have areas in the right hemisphere myelinated. The right hemisphere myelination pattern can leave 50% of the students in a negative position in the view of many educators.

Other abilities that also develop when the prefrontal lobes myelinate are the feelings of empathy, compassion, altruism, and parenting. Right hemisphere dominant students will naturally have these tendencies, while left hemisphere students may seem to be missing these qualities until the prefrontal lobes develop. Those students showing a lack of empathy and compassion will have relationship problems with those students, teachers, administrators, and parents who highly value these characteristics. The downshifting that occurs because of the interaction of these individuals with different value systems is compounded by the act of downshifting itself. Individuals in a downshifted mode lose more of their abilities of empathy and compassion. This loss increases the behaviors that caused the downshifting in the first place. Right hemisphere dominant students have a distinct advantage in this area.

Another part of the human brain that is late to myelinate is the frontal lobe area. The frontal lobes do not myelinate until between 16 and 21 years of age. The development of the

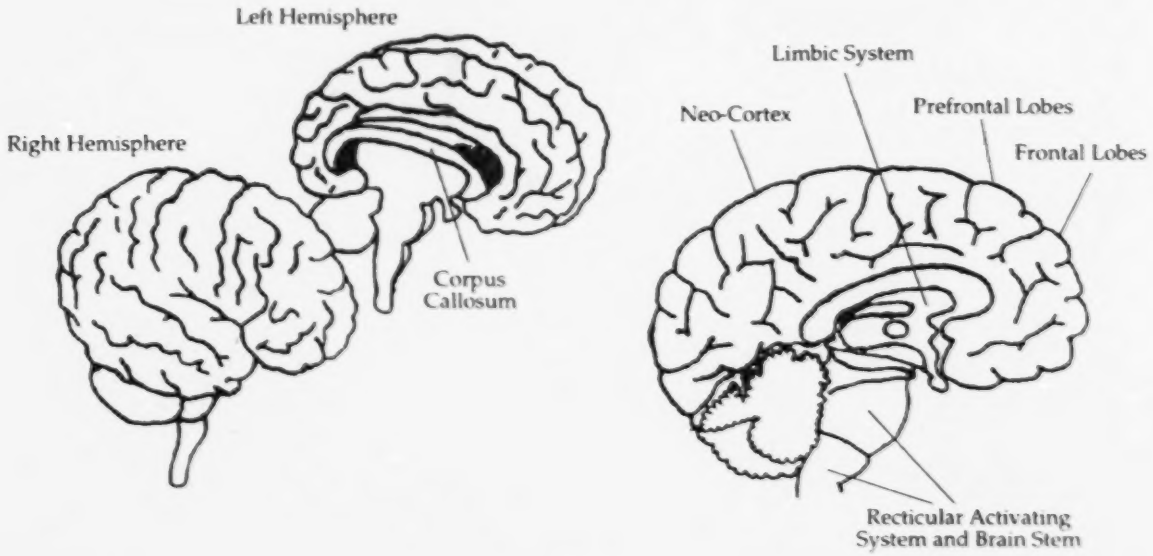

Figure 2. Diagram of the brain.

frontal lobes gives individuals greater complex thinking and problem-solving abilities. Here, it is also the right hemisphere dominant students who have an early advantage. When students have the appropriate areas of the right hemisphere myelinated, they have natural problem solving and complex thinking abilities. The right hemisphere's neural connection pattern allows it to be very quick and creative, coming up with many possible solutions, being able to see many possibilities, and questioning the future. Those students who inherit more of a left hemisphere myelination pattern usually will not do as well in school in the areas of complex thinking and problem solving.

Because of the different cell connecting patterns in the two hemispheres, it has been found through extensive testing that certain tasks are handled in specific hemispheres of the brain. Left hemisphere dominant students will usually have greater abilities in spelling, language, history, math computations, and business and organizational skills. Right hemisphere dominant students will usually have greater abilities in such areas as problem solving, creativity, creative writing, geometry, art, music, and visual-spacial skills.

So we see that there are natural "brain caused" strengths and weaknesses for each individual student. Some of these differences are caused by the brain not being fully developed. These problems may disappear when the brain finishes its growth. Other ability weaknesses in areas like spelling, writing, math, art, body coordination, music, problem solving, organization, and flexibility may continue throughout the life of the student. This does not mean that certain lower levels of proficiency in these abilities cannot be reached, it just means that learning these skills or abilities will be harder for those who lack the needed myelination. Our brain's myelination pattern determines our strengths and weaknesses. These differing abilities set us up for a tendency, need, or like for specific occupations. These occupations depend upon those skills or abilities at which our brain excels.

Since the educational system is the caretaker of millions of brains in transition from childhood to adult life, it seems that the most important goal would be to avoid anything that impedes the development of the students' brains. The most important problem that must be avoided is downshifting from the neo-cortex down to the limbic system. Downshifting causes long term and short term memory to be shut off. When this happens, dendrites or dendrite branches will not be created and the brain will not develop. Another problem which compounds the situation is that during downshifting the left hemisphere is used more often. This causes individuals to be more locked into their viewpoint, not being as able to consider the viewpoints of others. This lack of flexibility slows the maturation process that is needed for individuals to be more efficient in handling the problems in their world.

Since anger caused by downshifting causes downshifting in others, anger must be removed from our schools.

Since lack of ability leading to failure causes downshifting that blocks learning, the lack of ability of students must be handled so that downshifting does not occur.

The intentions of the members of the educational system have always been to help students learn. With this latest information, educators should be able to develop methods to increase student learning. It may be difficult to change some of our present practices, but the improved future of our children and entire society depends upon positive changes. Avoiding downshifting will inevitably lead to increased self-esteem, increased achievement, and greater happiness for all concerned.

As a part of the data collection portion of my research, I polled my students as to their happiness levels at home and at school. I

found that 81.8% of students who were happy at home and school could achieve a 3.0 GPA or better. If students were unhappy at home but happy at school, only 80% of the students could still achieve a 3.0 GPA or better. When students are unhappy at school, even if they are happy at home, only 50% of the students in this group will achieve a 3.0 GPA or above. If the students are unhappy at school and at home, only 20% of these students achieve a 3.0 GPA or better. Being happy without anger and anxiety in school is the major factor affecting school success.

It seems very logical to most of us, when we take the time to think about it, that unhappy or angry children or adults will be less interested in doing high quality work. Consider the fact that members of different temperaments downshift or get angry for different reasons, and that people in each temperament group have different needs and expectations. With this in mind, it is easy to see that

Temperament Groups	What others do that causes this temperament to downshift or be irritated	What this temperament would like others to do to please them
SJ 38% of population are Left Hemisphere Dominant	Don't follow rules Question authority Question procedure Don't finish tasks Be late Be disrespectful	Follow rules Be on time Follow through with what you say Value their leadership Be respectful
SP 38% of population Left Hemisphere Dominant with Right Hemisphere influence	Give them orders Limit their freedom Question their values Hurt their friends Insist they do something else Deny them the right to believe differently to their beliefs	Ask them for help Consider their point of view Support their rights Be flexible Treat their friends well Accept their rights
NF 12% of population are Right Hemisphere Dominant	Yell at them Question their value Question their caring Not show you care Exhibit insensitivity Yell at others	Say you care Express their value Say they're needed Value their caring Recognize and appreciate differences in people
NT 12% of population Right Hemisphere Dominant with Left Hemisphere influence	Question their knowledge Question their veracity Make fun of their ability Argue illogically Talk down to them Create a commotion Be in authority without competency	Explain things well Value their thinking ability Compliment their abilities Accept their opinion Listen to them Agree with them

Figure 3. Common characteristics of the four major temperaments.

there is much opportunity for misunderstandings and disagreements leading to anxiety and anger. Figure 3 lists some of the more prominent characteristics of the four major groups or temperaments.

As evident in the figure, the needs and expectations of the different groups are quite diverse and often opposite. It is quite natural for people of different temperament to become irritated with each other. The problem is, since most people lack the knowledge of how their brain functions, they have little control over their negative emotions and behaviors. A recent newspaper article argued that since women who chose to have silicon breast implants did not have the correct information on the dangers of the procedure, they did not have true freedom of choice.

No Freedom of Choice Without Information

Students, teachers, administrators, and the parents cannot have true freedom of choice without knowledge of their brain and temperament.

You cannot have complete control over achievement without the proper information. It is my opinion that a presentation of this information will decrease anxiety and increase achievement in any school.

The irritation and anger that affect the achievement levels exhibited in a school are not limited to relationships between teachers and students, and teachers and administration. The individual relationships between all individuals in a school affect the success of that school. Relationships in families at home can cause individuals to be less productive at school. Even though the results of anxiety and anger are costly to all the individuals in a school, remember, there is no fault or blame involved in this problem. It is mainly caused by a lack of information. When the information is presented, it is not a cure all, but a tool that helps remove stress and anxiety, and increase achievement.

The ability to change the differing levels of stress and anxiety was quite apparent in the results of the in-class research (Beamish, 1993). Working with 7th and 8th grade students, it was decided to attempt to change the building-wide behavior and achievement levels of eighty-eight 7th grade science students. These students would be the test group and the other eighty-seven 7th grade students, who did not have science that semester, would be the control group. The students in the test group were tested for hemisphere usage preference and instructed in the areas of brain structure, function, and downshifting, to try to achieve the following goals:

1. Students will have an understanding of their own and other peoples' varying hemisphere usage preferences, and how these differing preferences affect feelings, thinking, and basic human interactions.
2. Students will understand how the brain functions and how to control downshifting.
3. Develop in the students the concept of ownership of their brain and an understanding of the importance of developing their mind for their future, no matter what hemisphere preference caused philosophies and/or behaviors are maintained by their teachers, parents, and peers.

After spending three 55-minute periods working on the above goals, the students were expected to raise their grade point levels, and decrease the number of discipline reports they received throughout the building during the first semester.

Figure 4 shows the amount of difference between the average grade point of each student for the last quarter of the previous school year, compared to the grade point average for the first quarter of their present school year.

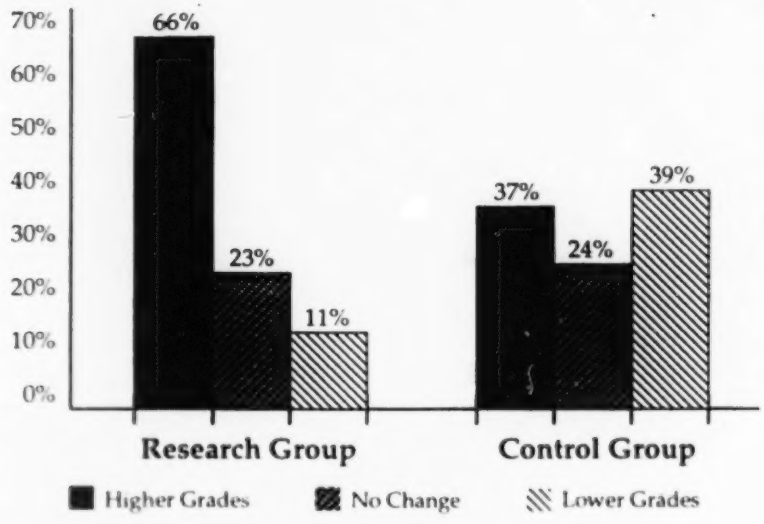

Figure 4. Research results.

The results were encouraging in both increased achievement, and with large numbers of students whose behavior improved building wide. This research was repeated the following three years and the students in the test group always had improved grades and behavior. Consider the possibilities. We could increase student and teacher self-esteem, and achievement levels. We could decrease discipline problems and drop-out rates, all by giving educators, students, and parents enough information on how the brain functions, so they can take ownership, control, and responsibility for their role in the educational system. The road to success is to empower both the student and the teacher with a new freedom of choice through increased information and awareness. But, how do we determine true success or high achievement for any one individual?

Carl Jung (1938) spoke of individuation, the process of individuals developing themselves to their fullest potential. This means each individual, no matter how different from others, achieves his/her greatest potential. Looking at all of the occupations that exist, we can see the need for all of our diverse abilities. With such diversity, to decide whether individuation occurs, we must first define or determine what would be the fullest potential for any one individual. Howard Gardner (1983) speaks to a natural diversity when he lists the following seven types of intelligence:

1. Linguistic Intelligence
2. Logical-Mathematical Intelligence
3. Musical Intelligence
4. Spatial Intelligence
5. Bodily-Kinesthetic Intelligence
6. Intra-Personal Intelligence (Examination and knowledge of our own feelings)
7. Inter-Personal Intelligence (Looks outward toward behavior, feelings, and motivation with others)

If we look at all of the activities or occupations that humans must master in order to succeed in this world, it should not be surprising that different individuals will have differing natural levels of ability for each of the seven different types of intelligence. If all hu-

mans were given the same exact abilities, we would all be competing for the same job or occupation. The diversity of "brain-caused-abilities" needed to succeed in all of the occupations that exist in our society is staggering. To support the concept of individuation, educators need to support, value, and nurture the unique combinations of special abilities or intelligences of each "differing" individual student.

By valuing any two or three of the seven forms of intelligence more than the other four forms of intelligence, you can create a situation where large numbers of students will be found lacking in ability. This will lead to downshifting, the special brain protective method that occurs during periods of stress or anxiety. Remember, downshifting switches blood flow and usage area down in the brain to a faster-acting portion of the brain called the limbic system. When downshifting occurs, long and short term memory are turned off and the natural brain abilities of compassion, empathy, problem solving, cause and effect reality, flexibility, and creativity are all extremely limited. Any students, who are found lacking the needed forms of intelligence upon which a school evaluates its students, will usually downshift. The loss of long and short term memory during these stressful periods of failure or inadequacy increases the rate of failure. The loss of empathy, cause and effect reality, and flexibility set many of these students up for behavioral problems. Now the student not only lacks a needed ability but also lacks long and short term memory and may have many discipline problems. This situation decreases achievement which increases downshifting and negative behavior, which in turn again decreases achievement and increases downshifting and negative behavior. A self-feeding negative spiral is created that is fed by failure and punishment.

It is tragic that this entire negative situation is created by an educational system that has decided to select just a few forms of intelligence as a basis for the evaluation of total intelligence. Since close to 80% of the general population has a greater left hemisphere dominance, it is not surprising that the left hemisphere linguistics and mathematical intelligences form the basis for the majority of most school evaluations of intelligence. When all students are measured by the left hemisphere subjects of language and math logic, it should be expected that the more right hemisphere dominant students will be pushed toward downshifting and decreased achievement. In severe cases it can end in a self-feeding negative spiral leading to the student dropping out of school. Downshifting from lack of success or ability is the largest roadblock to achieving individuation. It is sad that the naturally needed diversity of human ability, that is so needed by the entire society, can be overlooked by the majority. It is also sad that this diversity can be used against those lacking a school's chosen "needed" behaviors and abilities.

In order for all individuals to reach full individuation, an educational climate must be created that recognizes the value of all forms of intelligence. Simultaneously, each individual must be supported and nourished as he/she continues the development of his/her brain, moving toward full individuation. This means each individual, no matter how different from others, will attain his or her greatest potential.

Because of the varying differences between students, teaching to allow all students to reach greater levels of individuation takes some very special measures. Many of these needed techniques will be in opposition to many teachers', parents', and administrators' belief systems. The teaching for individuation process is a process of adapting to or minimizing the effects of the individual student's deficits.

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Downshifting

It is important to realize that anger, anxiety, and lack of success can all cause downshifting. Downshifting is a protective function in the human brain, where the brain shifts blood flow and usage area down into the limbic system. When students downshift and use the limbic system, long and short term memory plus complex thinking and problem solving are severely limited. Because of this loss of long and short term memory, complex thinking, and problem solving, the student's learning rate can decrease to as little as 10% of normal. To the contrary, in a warm, caring, exciting, successful classroom environment, students have full use of their upper brain, the neo-cortex. More important is that in this warm, caring, exciting, successful classroom environment the students' brains can secrete special neurotransmitters. These special neurotransmitters can increase learning rates up to 400% of normal. Consider the possibilities your students, in a positive, enjoyable, classroom environment, could learn at a rate 40 times faster than those students in negative environments.

All of the following concepts are addressed with the idea of avoiding downshifting in specific groups of students. It is extremely important that all students stay in their upper brain. The following concepts do not have to be addressed and probably will not be in many schools or classrooms. They will only be addressed if we decide that the outcome of our educational system is more important than our own varied beliefs of how the system should operate. The choice is an individual choice. Now let's look at the rest of the parts of the teaching for individuation process.

Teaching the Students about the Brain

Students should be given sufficient knowledge about their own brain and how it determines personality and aptitudes so that they can gain greater self-esteem and control over downshifting. To do this, the students should be tested for hemisphere usage preferences and instructed in the areas of brain structure, function, and downshifting. Remember, using this process we are trying to achieve the following goals:

1. Students will have an understanding of their own and other peoples' varying hemisphere usage preferences and how these differing preferences affect feelings, thinking, and basic human interactions.
2. Students will understand how their brain functions and how to control downshifting.
3. Develop in the students the concept of ownership of their brain. This includes an understanding of the importance of developing their own mind for their future, no matter what hemisphere preference-caused philosophies and/or behaviors are maintained by their teachers, parents, and peers.

The presentation of this material usually takes about three hours of class time. It is one of the most important parts of the teaching for individuation process. The earlier students can be exposed to this material, the easier it will be for them to learn. If the material is presented at the elementary level, it should be repeated or reinforced every two or three years. It also helps to have signs placed around the school reminding students of their responsibility to develop their own brain. The signs can say such things as: "Dendrite Power," "Downshifting decreases memory," "Are you developing dendrites today?," "Individuation: Becoming the best you can be," etc. The key to this part of the process is the validation of all individuals in the school, and then working to increase achievement and self-esteem.

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Explaining the Whole Picture Before Starting a Unit

Before the introduction of new materials, the whole picture or the overall view of what is to be covered needs to be presented so that right hemisphere dominant students can be comfortable. After this, the individual pieces of the concept or idea need to be presented for both the left and right hemisphere dominant students.

Adapting for the Low Reader

If students have low reading levels, this deficit should be worked on in only one class. In all other classes all materials that are needed, including all tests and quizzes, need to be read to the these students. This allows the non- or low-reading students to be more successful. This success in other classes will upshift these students, allowing them to be more successful in their reading class. I remember running into one of my former students while I was out cutting firewood. He was a logger. He said, "Do you realize that I could never concentrate in your class because I was always afraid you would ask me to stand and read something out loud?" I said, "But, I never asked anyone to read anything." He said, "But, I didn't know that." For students who have reading problems, just the anxiety from not knowing what to expect from a teacher can cause them to downshift and lose their ability to learn. These students should always be told about a teacher's expectations or lack of expectations.

Outlining and Organizing for the Right Hemisphere Dominant Student

Most of the right hemisphere dominant students and the process-oriented left hemisphere dominant students lack organizational and outlining skills. For these students, all test materials and other needed materials should be outlined on the chalkboard or copied and handed out on paper. Students should always know which materials they will be tested on. When testing, having each individual student guess what material to study only sets up those students with less insight for failure. Students also need to be taught to make lists to keep track of their work. At some stage in the educational system these students should be given weekly and monthly calendars. If we teach students how to use lists and calendars and monitor their use, the students should gain more left hemisphere skills. These increased left hemisphere skills will allow the students to be more successful, thus preventing downshifting.

Auditory, Visual, & Kinesthetic Plus Right and Left Hemisphere Teaching

All course materials need to be covered in at least three different modes: auditory, visual, and kinesthetic. This will allow all the students access to the material with their own method of perception. All materials also need to be presented in both a left and a right hemisphere mode. Many students who cannot learn in a left hemisphere mode will learn very easily in a right hemisphere mode.

High Positive Expectations and Guaranteeing Success

One of the most crucial points of this classroom technique is "high positive expectations." The most important concept is that every student can learn. A teacher should truly believe that all students can learn and should continually express this belief to the students. Throughout each unit, teachers need to monitor the students' progress with quizzes that do not affect the students' grades. This will allow the teacher to give tests only when the teacher is sure that all students will be successful. If a student fails to study for a test or forgets the quiz material, it should be given over without penalty until the student is successful. Success breeds success. Once students learn that they can learn and that the teacher will not accept anything else, learning becomes the norm and much easier.

Handling Discipline

Handling discipline will take a major mental shift. To perform this shift, teachers will need more information on how brain usage

patterns create personalities. Included in this new knowledge will be information on the common reasons for student downshifting plus how to keep students in their upper brains. Teachers will need the results of two very important student tests. The two tests that students should complete are the Brain Hemisphere Usage Sorter and the Auditory, Visual, and Kinesthetic Sorter. The best place for displaying this information is on the class seating chart. This allows a teacher immediate access at a glance. With this new information, teachers will be able to manage their classrooms with a new insight. Remember, the major key to learning is still to avoid downshifting.

Classroom Setup

Because of the dominant left hemisphere thinker's drive for fairness and the dominant right hemisphere feeler's need for caring, the rules or setup of a classroom become very important. As far as seating goes, I have found that if students are allowed to choose their own seats, it adds to the student's enjoyment of the class. This will increase the learning rate. As long as a student shows courtesy in doing so, students should be allowed to get up at anytime to sharpen their pencil. If students are hungry, they should be allowed to eat part of their lunch or other food, if they do not make a mess or disrupt the class. While the teacher is presenting material all students should be quiet and attentive. If the students are not quiet and attentive, the teacher should stop teaching. When the teacher is not presenting, students should have the freedom to talk or move around, in order to further study or work on the material. For those students who master the material early, quiet enjoyable activities should be provided. There should be no restrictions on the use of the bathroom. The quickest way to lose your ability to concentrate or learn is to be unable to go to the bathroom when needed. The basic idea is that whatever needs or freedoms a teacher might enjoy, also should be granted to the students.

Grading

When we look at grading we find two major problems. First is deciding on what basis we will determine a student's grade. If we grade on a student's process of learning, we will usually discriminate against those students who do not follow an individual teacher's expected process. If our purpose is to have students learn, then the only thing that should be graded is the final test results. Assignments late or early, complete or incomplete, quizzes successful or unsuccessful should not be used as a basis for grading. These parts of the learning process need to be monitored, finished, and of as high a quality as the student is capable. But, the actual grade should be determined only by results of the final tests.

The second problem that we encounter is that if we change our teaching methods so that all students can learn all the material we teach in a specific unit, they all should score above 92% on the final test. If scoring 92% and above on a test is considered to be an A, what happens when all students start getting A's? What happens to the grading system? What will the parents say? The interesting thing about this increase in student success is that the yearly state testing scores also rise. Using this method to teach science over a period of many years, we could maintain high state testing scores. If the process could be used building-wide, the learning rate should drastically increase. But, the grading system of A, B, C, D, F has been around forever. What are we going to do if all the students become successful? This indeed will be a major hurdle to the process of individuation.

How Do We Handle Students Who Naturally Lack Certain Skills?

Now we come to an even bigger problem. If we choose to teach so that all students reach their own greatest potential, what about students who lack certain natural brain aptitudes? It seems as we view the results of comparing brain usage patterns to occupa-

tions chosen by individuals of specific brain usage patterns, we find that each occupation requires certain talents or abilities. If students have a deficit in math, when do we stop penalizing the same students year after year? If a student has a deficit in language skills, how many years do we keep trying to get these students to accomplish things they have a low ability to do? Not all individuals will need higher math skills or higher language skills. But, how do we know when enough is enough? Possibly, it will be easier for these students to work in their weaker areas of study once they are more successful in other classes.

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